Hoonah Energy Infrastructure Projects
10/20/06 Trip Report & Preliminary Information

November 13, 2006

On Thursday October 19 and 20, 2006, David Lockard of the Alaska Energy Authority / Rural Energy Group (AEA/REG) and John Dickerson of Alaska Energy and Engineering (AE&E) traveled to Hoonah. The purposes of this site visit were to: 1) meet with local officials as well as representatives of local and regional organizations to identify and discuss potential energy infrastructure projects within the community; 2) to gather reconnaissance level information for preparation of a Conceptual Design Report (CDR) for any identified energy infrastructure projects and; 3) to collect field data for the installation of a new 12,000 gallon double wall fuel tank at the IPEC power plant.

After a short weather delay in Juneau we arrived in Hoonah by plane around 1 PM. After a tour of the community we met Keith Berggren, Peter Bibb and Thomas Jack of Inside Passage Electrical Cooperative (IPEC) at the power plant. We spent the afternoon inspecting the IPEC facility and as-builting the site in order to determine a suitable location for the proposed new fuel tank. A meeting was held the next morning at 8 AM to discuss potential energy infrastructure projects in Hoonah. David Lockard discussed the AEA/REG rural energy programs as well as Denali Commission (DC) funding requirements. Much of the meeting was spent discussing the proposed AEL&P Hoonah intertie extension as well as potential local hydro projects, the proposed City/Hoonah Trading consolidated bulk fuel storage project and the potential use of generation heat recovery in Hoonah. Meeting attendees included:

- Dennis H. Grey, Sr., Mayor, City of Hoonah
- Jerry Medina, Administrator, City of Hoonah
- Jan Supler, Vice President Retail Operations, Wards Cove/Hoonah Trading
- Steve Brown, General Manager, Hoonah Trading
- Tim McLeod, General Manager, AEL&P
- Corry Hildenbrand, Energy Resource Developer, AEL&P
- Vern Rauscher, General Manager, IPEC
- Keith Berggren, Generation Manager, IPEC
- Peter Bibb, Distribution Manager, IPEC
- Dick Somerville, P.E., PND Engineers
- Don Reid, Alaska Marine Lines

Following the meeting we reviewed plans for the new Hoonah Marine Industrial Center and visited the site where phase I of the project is currently under construction. Discussions were held regarding the preferred location and layout of the proposed consolidated bulk fuel storage facility, automotive gas station, truck loading/bulk transfer facility, marine dispensing float, large vessel marine fuel dock and marine header.

The following report is based on reconnaissance level information gathered during and subsequent to this site visit. It includes preliminary information on:

1) Proposed AEL&P Hoonah intertie extension
2) AC vs HVDC transmission technology for the Hoonah Intertie
3) Three potential local hydroelectric projects near Hoonah

4) Potential generation heat recovery project
5) Existing IPEC power plant
6) Estimated future community power demand
7) Proposed IPEC power plant upgrades
8) Replacement generator selection
9) Proposed IPEC distribution upgrades
10) Existing IPEC tank farm
11) New IPEC power plant fuel tank
12) Existing Hoonah Trading bulk fuel storage facility
13) Required community fuel storage capacity
14) Proposed new tank farm, bulk transfer and dispensing facilities
15) Alternative energy

This report along with comments from project participants will outline the issues to be addressed in the CDR.

1) AEL&P Hoonah Intertie Extension:

The proposed Hoonah intertie extension is part of a long term effort by AEL&P, IPEC, The Southeast Conference and the City of Hoonah to construct a transmission link between Juneau and Hoonah. The intertie would allow the community of Hoonah to take advantage of AEL&P's excess hydroelectric generation capacity and eliminate diesel generation in the community.

The first leg of the intertie to the Greens Creek mine was completed in July, 2006 at a cost of approximately $9 million. This leg included a 9.5 mile long submarine cable between Douglas and Admiralty Islands as well as six miles of overhead transmission line to the Greens Creek Mine. According to AEL&P current average loads at the mine are running around 8 megawatts and near term total annual energy requirements are expected to be in excess of 70GWh, higher than originally anticipated.

If constructed, the Hoonah intertie extension would include a 25 mile long submarine cable between Admiralty and Chichagof Islands as well as a 3 mile long overhead transmission line to Hoonah. According to a recently updated estimate by AEL&P the cost of the Hoonah Intertie would be approximately $29 million for design, permitting and construction. The long term annual energy requirements of Hoonah are expected to be 6 to 7GWh. Permitting would likely take one to two years. Engineering completed to date includes a power flow analysis by Power Engineers, Inc. and a preliminary submarine cable design by Nexans and BC Hydro. An amount of $1 million was recently awarded to IPEC by DOE for submarine cable route bathymetric studies and permitting.

According to AEL&P, if the Hoonah intertie were constructed today the rate to IPEC would be $.10/KWh and would include all O&M as well as a contingency for cable repairs and replacement. This rate would be "interruptible" in that Juneau area customers would receive first priority in times of limited hydroelectric generation while Hoonah would have priority of usage over the Greens Creek mine. It is assumed that if constructed the Hoonah intertie would provide virtually all the power required by the community of Hoonah and that

no upgrade to the existing IPEC power plant or new local hydroelectric projects would be considered.

An economic analysis of the Hoonah Intertie titled "Hoonah Intertie Extension - Economic Considerations" was recently prepared for AEA by Emerman Consulting, LLC and will be included as an appendix in the final Hoonah Energy Infrastructure Upgrade Projects CDR. Four separate scenarios were analyzed using different fuel prices, project schedules and Hoonah energy requirement estimates. The benefit to cost ratios of the four scenarios calculated over the estimated 30 year economic life of the intertie ranged from 0.78 to 0.50.

Additional research on the proposed intertie will be conducted and will be included in the final Hoonah Energy Infrastructure Projects CDR.

2) AC versus HVDC transmission technology for the Hoonah Intertie:

Appendix E of the "Southeast Alaska Intertie Study Phase I Final Report" prepared by D. Hittle & Associates for the Southeast Conference in 2003 includes a report on alternate energy transmission technologies study conducted for the proposed interties. The study concluded that an HVDC (High Voltage Direct Current) system would be feasible but more expensive than an AC system for the Hoonah Intertie. The following are some comparisons of HVDC and AC transmission technology for the proposed Hoonah intertie:

- Submarine cable lengths are limited to between 40 and 50 miles in AC transmission systems due to capacitive currents. HVDC systems make much longer submarine crossings possible because they do not generate capacitive currents. With a crossing length of only around 25 miles the Hoonah intertie is well within the limits for submarine cables in AC systems.
- HVDC systems can carry more current on a given size cable than with an AC system. However, the size of the submarine cable specified for the Hoonah intertie is controlled by the strength requirement of the cable rather than by the conductive capacity. This offsets any potential savings of an HVDC system due to conductor size advantages for the Hoonah intertie.
- Low cost extruded polymer cable has recently been developed for use in HVDC systems. Extruded cables are less expensive than other cable technologies but have little history in submarine applications. There is also as yet no proven technology for repairing a damaged submarine extruded cable.
- HVDC systems can be constructed with a single cable where ground return is used. However a single cable HVDC system is not considered an option for the Hoonah intertie due to environmental, permitting and reliability issues. Therefore a two-cable HVDC system would be required. Three-phase AC submarine cable is available as a bundled unit while the HVDC system would require two separate cables. The per unit cost of the HVDC submarine cable would be less than the bundled three-phase AC cable but the total submarine cable cost for the Hoonah intertie would be higher for the HVDC system due to the requirement of two separate cables.
- An HVDC intertie would require a total of two voltage source converters (VSC) for conversion of AC to HVDC and then back to AC. In 2003 the price estimate of each VSC was $3.2 million.

Additional research into the latest HVDC technology available will be conducted and will be included in the final Hoonah Energy Infrastructure Projects CDR.

3) Three Potential Local Hydroelectric Projects Near Hoonah:

In June, 2002 HydroWest Group, LLC, a subsidiary of AP&T, published a report titled "Reconnaissance of Three Potential Hydroelectric Sites Near Hoonah, Alaska". This report was commissioned by the City of Hoonah. It was preceded by a previous study titled "Gartina Creek Project - A Reconnaissance Report" performed in 1979 by Harza Engineering for the Alaska Power Authority. A review and update of the 1979 report titled "Concept Review Report, Gartina Creek Hydroelectric Project" was performed in 1998 by HDR for the City of Hoonah. The three identified hydroelectric prospects in the Hoonah area are identified as Gartina Creek, Water Supply Creek and Elephant Falls. Water Supply Creek and Elephant Falls are both tributaries of Gartina Creek. All flow data for these three drainages is transposed from the stream gage records of the Kadashan River drainage near Tenakee which is very similar in geology, precipitation, orientation and elevation to the three Hoonah sites.

Gartina Creek

The Gartina Creek project as described in the 2002 HydroWest report consists of the following components:

- A fifteen feet high concrete and rockfill diversion dam.
- A concrete intake structure and sluiceway
- A 54-inch diameter steel pipeline approximately 200 feet long from the intake structure to the powerhouse.
- A 20'x20'x25' high two level reinforced concrete powerhouse
- A single turbine with 600kW three-phase generator.
- Programmable automatic paralleling switchgear with remote control and unattended operation capability.
- A pad-mount disconnect switch and step-up transformer bank adjacent to the powerhouse.
- Approximately four miles of 12.5kV three-phase overhead transmission line to an interconnection near the Hoonah airport.
- An approximately 0.3 mile long access road from an existing Forest Service road to the intake structure and powerhouse.
- The Gartina Creek site is estimated to have an average annual flow of around 66 cfs, a maximum divertible flow of 140 cfs and a net head of 61 feet. Using a flow-duration method, the maximum potential annual generation of this site was estimated in the HydroWest report to be 1,880,00kWH. The estimated construction cost for the Gartina Creek site is $3.75 million based on 2006/2007 construction.

Water Supply Creek

The Water Supply Creek project as described in the 2002 HydroWest report consists of the following components:

- An eight feet high concrete and rockfill diversion dam.

- A concrete intake and sluiceway
- A 5,500 feet long combination 24" diameter HDPE and 20" diameter steel pipeline from the intake structure to the powerhouse.
- A 20'x40'x15' high single story pre-engineered metal building powerhouse.
- A single turbine with 600kW three-phase generator.
- Programmable automatic paralleling switchgear with remote control and unattended operation capability.
- A pad-mount disconnect switch and step-up transformer bank adjacent to the powerhouse.
- Approximately four miles of 12.5kV three-phase overhead transmission line to an interconnection near the Hoonah airport.
- An approximately .25 mile long access road from an existing Forest Service road to the intake structure and powerhouse.
- The Water Supply Creek site is estimated to have an average annual flow of around 9 cfs, a maximum divertible flow of 20 cfs and a net head of 400 feet. Using a flow-duration method, the maximum potential annual generation of this site was estimated in the HydroWest report to be 1,820,00kWH. The estimated construction cost for the Water Supply Creek site is $3.1 million based on 2006/2007 construction.

Elephant Falls

The Elephant Falls project as described in the 2002 HydroWest report consists of the following components:

- An eight feet high concrete and rockfill diversion dam.
- A concrete intake and sluiceway
- A 3,900 feet long combination 18" diameter HDPE and 15" diameter steel pipeline from the intake structure to the powerhouse located on Gartina Creek.
- A 20'x40'x15' high single story pre-engineered metal building powerhouse.
- A single turbine with 600kW three-phase generator.
- Programmable automatic paralleling switchgear with remote control and unattended operation capability.
- A pad-mount disconnect switch and step-up transformer bank adjacent to the powerhouse.
- Approximately four miles of 12.5kV three-phase overhead transmission line to an interconnection near the Hoonah airport.
- An approximately 4,000 feet long access road from an existing Forest Service road to the intake structure and an approximately 7,500 feet long access road from an existing Forest Service road to the powerhouse.
- The Elephant Falls site is estimated to have an average annual flow of around 4 cfs, a maximum divertible flow of 9.3 cfs and a net head of 800 feet. Using a flow-duration method, the maximum potential annual generation of this site was estimated in the HydroWest report to be 1,780,00kWH. The estimated construction cost for the Elephant Falls site is $3.76 million based on 2006/2007 construction.

The potential annual generation capacity calculated for each of these sites is only available if the local load is always in excess of the available hydroelectric generation. During seasonally high stream flow periods, the nighttime community loads will fall below the anticipated 600kW hydroelectric generation capacity. This will result in the usable annual generation capacity being less than the potential annual generation capacity quoted for each site. If two of these sites are developed even less of the potential annual generation would be usable, especially during high flow periods. The annual usable generation from a single and two-site hydroelectric project was estimated using available transposed stream flow data, five percent flow duration charts and IPEC community average load data. The results indicate that if only one of these hydroelectric sites were developed it would provide approximately 30% of Hoonah's near term projected annual generation demand. If two of these sites were developed they would provide approximately 50% of Hoonah's annual generation demand.

The HydroWest report addresses permitting issues for each of these sites. The Gartina Creek and Water Supply Creek projects would fall under the State of Alaska small hydroelectric project exemption from Federal Energy Regulatory Commission (FERC) jurisdiction. Because the Elephant Falls site is within the Tongass National Forest, it would fall under FERC jurisdiction unless a land exchange with the City of Hoonah or Sealaska Corporation could be arranged.

The HydroWest report also addresses environmental issues for each of these sites. The primary environmental concern is the possible impact on anadromous and resident fish populations due to reduced in-stream flows between the intake structure and the power house. Because Water Supply Creek and Elephant Falls are located above Gartina Falls, no anadromous fish will be present and only resident fish populations are of concern. The bypassed reach of stream for the Gartina Creek project does include salmon pools at the base of the falls. This could result in increased bypass flow requirements or significant increases in construction costs.

4) Potential Generation Heat Recovery Project:

The IPEC Hoonah power plant has burned an average of 360,000 gallons of diesel annually over the past two years. An efficient generation heat recovery system will recover the heating energy equivalent of approximately 20% of the fuel burned by the generators. Using this rule of thumb, the IPEC generators have the potential to provide the heating equivalent of over 70,000 gallons of diesel fuel in recovered generation heat annually.

The swimming pool, school buildings, fire hall, senior center, senior apartments, and clinic are all located in the same general vicinity. These six public facilities use approximately 60,000 gallons of diesel annually for space heating.

Ideally the power plant should be located as close as possible to the recovered heat end use facilities to minimize conductive heat looses in the buried pipe. However the existing power plant is located approximately one half mile from the school site where the bulk of the recovered heat would be used and no suitable sites for power plant relocation have been identified. Assuming four inch diameter arctic pipe and a total buried length of one mile for supply and return piping, the conductive heat losses would be the equivalent of approximately 20,000 gallons of diesel annually, reducing the net available recovered generation heat to the equivalent of around 50,000 gallons of diesel.

The final CDR will include a proposed heat recovery pipeline routing plan and cost estimate for supplying recovered heat to the previously mentioned public facilities.

5) Status of Existing Hoonah IPEC Power Plant:

The IPEC (originally THREA) power plant was constructed in the 1977. It is located on the eastern edge of town at the intersection of Gartina Highway and White Alice Site Road. The building is a 40'Wx100'L metal-sided, pre-engineered steel frame structure that houses three generators, an office and a warehouse. The interior walls are covered with painted plywood up to a height of 8' with vinyl-encased fiberglass batt insulation exposed above and across the ceiling. The exterior metal siding is in good condition but the exterior paint is in very poor condition and is peeling badly. The concrete foundation, steel frame members and horizontal steel girts appear to be in good condition. According to the operator, the finish grade around the plant does not drain well and the plant is prone to minor flooding, especially during spring breakup.

There are three Caterpillar generators installed in the power plant. Unit #1 is a model 398 with a capacity of 600kW at 1,200RPM. The 398 is an antiquated pre-combustion design with poor fuel economy and increasingly difficult availability of spare parts. This unit is used for emergency backup only and is slated for replacement. Unit #2 is a model 3512 with a prime capacity of 1,100kW at 1,200RPM. Unit #3 is a model 3512 with a prime capacity of 855kW at 1,200RPM. Units #2 and #3 each have approximately 66,000 total engine hours. With the current schedule of a top-end overhaul every 11,000 hours and a major overhaul every 22,000 hours, IPEC expects to get at least an additional 54,000 hours each from existing units #2 and #3, barring any unforeseen circumstances.

Engine cooling is with three remote radiators located outside at the front of the power plant. Each generator is on a stand-alone cooling system with one radiator. There is currently no generation heat recovery equipment installed.

Power generation is at 4160V 3-phase. There are two separate community feeders with one pole-mounted and one pad-mount step-up transformer bank within the fenced area adjacent to the power plant. Station service is provided by a metered 480V three phase load center as well as an un-metered 120/208V three phase load center. The 5kV manual paralleling switchgear was installed new in 1990. It includes a section for each of the three generators and a feeder/station service section.

6) Estimated Future Community Power Demand

According to IPEC data, the current annual peak generation load in Hoonah is around 900kW, the average demand is around 596kW and the annual generation requirement has averaged 5.2GWh over the past two years. IPEC load data indicates that current seasonal load variations in Hoonah are minor, with summer and winter loads being very even. Steady growth in summer peak loads and annual generation are likely over time due to expected increases in tourism, with annual generation requirements likely to grow to over 6GWh within five years. It appears that both generators #2 and #3 are adequately sized to handle the estimated near term growth in community demand. Additional research will be conducted into potential community peak load and generation requirement growth and will be included in the final CDR.

7) Proposed IPEC Power Plant Upgrades

As mentioned previously, if the proposed AEL&P Hoonah intertie extension is constructed then it is assumed that no upgrades will be performed at the IPEC plant other than the new fuel tank (see item 11). If the community remains reliant exclusively on diesel generation or if a combination of local hydroelectric and diesel generation is the long term solution then the following upgrades to the existing IPEC power plant are proposed. These upgrades are intended to modernize the power plant and to improve the overall fuel efficiency, reliability, fire prevention/protection, noise control and operations at the facility:

- Re-grade area around plant to improve area drainage
- Replace existing generator #1 with new generator
- Replace existing switchgear and relays with new automatic paralleling switchgear
- Replace all exterior sheet metal
- Replace existing ventilation louvers and ridge vent with sound-insulated air intake and exhaust fan ducting
- Replace existing engine coolant piping with common cooling manifold including a heat exchanger to allow for utilization of recovered generation heat
- Replace existing radiators with new radiators and variable speed motor controls
- Replace existing non-operative fire suppression system with new fire suppression system
- Renovate and enlarge control room to contain new switchgear
- Install a used oil blender (the feasibility of this will need to be investigated more thoroughly in the Concept Design Report)

8) Replacement Generator Selection

- If a major renovation of the power plant is deemed necessary it is proposed that the existing antiquated Caterpillar Model 398 generator be replaced with a new, more fuel efficient unit. Assuming that the two existing 3512's are capable of handling the expected near term peak loads, the new generator should be prime rated to efficiently handle night time loads and to provide efficient peak-adding with hydroelectric power if constructed. A thorough investigation of all Caterpillar model gensets prime rated between 500kW and 600kW and available in current EPA tier ratings will be conducted prior to the Concept Design Report.

9) Proposed IPEC Distribution Upgrades

A 12.47/7.2kV overhead distribution system provides electric power to the community of Hoonah. The distribution system is in generally good condition but there is one issue that will need to be addressed in the near future. Phase I of the new Hoonah Marine Industrial Center is currently under construction along Gartina Highway, between the City dock and the ferry terminal. The existing overhead transmission line currently runs across an area that will be used for marine vessel and connex storage in the future. The City would like all distribution in this area to be buried to avoid any potential safety concerns with operating the new facility around the existing overhead power lines.

10) Existing IPEC Tank Farm:

The existing power plant tank farm was built in 1977. It consists of three old BIA style vertical tanks and two ex-military domed-end horizontal tanks in a lined earthen dike as well as a gravity-fed exterior day tank located adjacent to the power plant. The two horizontal tanks have since been taken out of service. The current tank farm configuration has a gross shell capacity of approximately 26,000 gallons, including a 3,000 gallon double wall day tank. All fuel is delivered to this facility by tank truck. Deficiencies at the facility include:

- aging, rusted tanks
- non-liquid tight dike membrane liner
- non-code compliant piping, valves and appurtenances
- lack of piping pressure relief
- lack of cathodic protection on buried pipe
- lack of tank emergency venting
- lack of overfill prevention on 3,000 gallon day tank
- 3,000 gallon day tank too close to the power plant building
- lack of surface flow containment at truck transfer area

11) New IPEC Power Plant Fuel Tank:

Because there is a reliable bulk fuel facility operator and fuel delivery service in Hoonah, IPEC no longer deems it necessary to store such large quantities of fuel at the power plant. At IPEC's request, AEA has approved funding for installation of a single new double wall tank at the power plant to replace the entire existing fuel storage facility. The proposed new tank location was inspected and some preliminary measurements were made during this site visit. The tank installation project will include the following items:

- excavation of hillside at west end of building to enlarge pad for placing new tank
- install new 10' diameter x 20' long 12,000 gallon gross shell capacity horizontal skid-mounted double wall tank with overfill protection
- install new security fencing
- re-grade yard area to provide surface flow containment around truck transfer area
- install new HDPE coated welded steel fuel oil supply and return piping in below grade concrete utilidor between the new tank and power plant to allow for vehicle access to step-up transformers behind power plant - provide removable cover for visual inspection of pipelines

See attached Sheets M1 and M2 for conceptual plans.

The IPEC tank project design will be expedited for summer '07 construction. The tank fabrication drawings will be completed in time for January '07 procurement and an early spring '07 tank delivery schedule. An as-built survey of the IPEC facility with surface contours is required for final site plan development. J. W. Bean Surveying will be in Hoonah around the first of the year to do work for the City and can perform the required survey work at that time. Final design will then be completed by February '07, with permitting and procurement to be completed in time for summer '07 construction.

12) Existing Hoonah Trading Bulk Fuel Storage Facility:

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The Hoonah Trading bulk fuel storage facility provides storage for virtually all the diesel fuel and gasoline received by the community. The facility consists of six in-service vertical steel bulk storage/dispensing tanks, a three product marine header, a three product marine fueling station, a three product vehicle gas station, a diesel truck loading rack, and three 4" diameter barge fill/distribution pipelines. The tank farm is located on the hillside above the Hoonah Trading store. Tank farm access is by a covered wooden stairway from 1st Street. The fuel is used for local power generation, vehicle dispensing, marine dispensing and heating fuel delivery. All dispensing and bulk transfers are by gravity.

The total gross shell capacity of the six bulk storage/dispensing tanks is approximately 154,000 gallons of #2 diesel, 19,000 gallons of #1 diesel and 38,000 gallons of unleaded gasoline. The facility appears to be old but is well maintained. The tank farm is built on a two-tiered site with four tanks on the lower level and two tanks on the upper level. It is completely surrounded by chain link fence. Concrete walls on the sides and across the front of both tiers provide some surface flow containment but there is no dike membrane liner and the containment is not liquid tight. The tanks are equipped with normal vents and manways. There are 4" flanged bottom connections with flanged steel ball valves and 1" threaded steel PRV jumpers for pipeline pressure relief. The manifold piping appears to be in good condition and is well supported but there are no flexes between tank connections. The tanks are all supported on concrete bases.

There are three each 4" diameter welded steel barge fill/distribution pipelines that run from the marine header to the tank farm, supported under the dock, then buried under the road and finally above grade up the hill to the tank farm.

A three product marine header is located on the end of the fuel dock. Each barge connection has a 4" quick disconnect hose coupling, a 4" flanged steel check valve, and a 4" flanged steel plug valve. There is a steel drip pan that serves all three marine header fill connections which does not appear to have adequate capacity to meet the 84 gallon containment requirement. The marine dispensers are also located under a rain shelter on the face of the fuel dock and are gravity fed with 2" welded steel branch pipelines off of the main 3" barge fill/distribution pipelines.

There is a truck rack located near the Hoonah Trading store that allows for bulk loading #1 or #2 diesel into a tank truck for fuel deliveries throughout the community. There is also a two product gasoline and #2 diesel vehicle dispenser located on the dock near the store.

The following is a summary of existing facility deficiencies observed:

- Improper Secondary Containment (Diking) –Tanks are not within a proper liquid tight secondary containment system of adequate capacity as required by the Fire Code and EPA regulations.
- No Emergency Vents - None of the tanks have emergency vents, in violation of the Fire Code.
- Improper Piping and Valves - Existing piping systems consist of steel piping with a combination of welded and threaded joints. The threaded joints are particularly prone to leaking.
- Gravity Dispensing - Code requires that all fuel dispensing be by pump.
- Above-Ground Dispensing Tank Capacity - State Fire Marshall requirements stipulate that the maximum size of an above ground dispensing tank is 12,000 gallons.

- Dispensing From Above-Ground Tanks Without Protective Systems - State Fire Marshall requirements stipulate protective devices and piping systems to prevent a gravity discharge of fuel in the event of a failure of the dispenser or piping. No protective devices are installed.
- Cathodic Protection of Buried Pipelines - Code requires all buried piping to have cathodic protected.
- Improper Site Location - The existing bulk/dispensing tanks do not appear to meet Fire Code minimum separation distance requirements from adjacent public ways and property lines for unprotected tanks.

This facility does not meet current code or regulation requirements and would not to be cost effective to renovate. Therefore it should be taken out of service and replaced with a new tank farm located at the new Hoonah Marine Industrial Center.

13) Required Community Fuel Storage Capacity:

Hoonah is located on a year round ice free port with a deep water dock capable of receiving ocean-going barges. Fuel deliveries by barge are available from at least two different vendors and are scheduled to be in the area at least twice per month. According to fuel delivery records, the community has recently averaged approximately sixteen barge deliveries per year, spaced from two weeks to one month apart. Based on this delivery schedule and to ensure no future disruptions in fuel supply, the facility should be sized to hold an approximate one peak month supply of each product with an adequate reserve margin. The following table compares the current annual and one peak month use for each product to the proposed net useable tank capacity for the new facility:

CONSUMPTION VERSUS CAPACITY

Product	Average Annual Use in Gallons (1)	Estimt'd Peak 1 Month Use in Gallons	Proposed Net Capacity in Gallons (2)	% of Est. Peak 1 Month Use	% of Est. Annual Use	Proposed Gross Capacity in Gallons
Gasoline	250,000	30,000	36,000	120%	14%	40,000
#1 Diesel	210,000	30,000	36,000	120%	17%	40,000
#2 Diesel	1,000,000	125,000	153,000	122%	15%	170,000
Avgas (3)	0	n/a	9,000	n/a	n/a	10,000
Total	**1,460,000**		**234,000**			**260,000**

(1) *Calendar years 2004 and 2005.*

(2) *Net capacity (90% of gross shell capacity)*

(2) *No existing avgas storage but planning to begin avgas sales at airport*

14) Proposed New Tank Farm, Bulk Transfer and Dispensing Facilities:

The proposed new tank farm will include a total of six each welded steel vertical bulk storage tanks, including four at 40,000 gallons for #2 diesel storage, one at 30,000 gallons for #1 diesel storage and one at 30,000 gallons for gasoline storage. There will also be two horizontal skid-mounted welded steel dispensing tanks, with each tank divided into two

equal 10,000 gallon partitions. The partitions will provide for dispensing of the #2 diesel, #1 diesel and gasoline as well as storage and transfer of avgas. Secondary containment will be provided by a lined concrete dike. A drive-through truck loading facility will provide for top loading of #2 diesel, #1 diesel and avgas. It will be constructed adjacent to the tank farm and situated so that secondary containment is provided by the tank farm dike. A service station style dual product gasoline and #2 diesel dispenser in the center of a two vehicle slab will be installed near the tank farm.

New 4" diameter pipelines will be installed for #2 diesel, #1 diesel and gasoline. A 2" diameter pipeline will be installed for avgas deliveries. The #2 diesel, #1 diesel and gasoline pipelines will be equipped with branch tees and isolation valves to allow them to serve as fill pipelines for barge deliveries as well as distribution pipelines for dispensing and bulk transfer operations. The pipelines will be suspended below the fuel dock and buried from the fuel dock to the new tank farm. A drip pan will be provided on the dock at the termination of the fill pipelines (marine header). A combination of centrifugal and submersible pumps will be used for bulk transfer and dispensing functions.

A large vessel marine fuel transfer facility with hose stands and meters will be located near the marine header on the main fuel dock. A separate fuel float will be used for retail fuel sales to smaller vessels and will include marine dispensing of #2 diesel, #1 diesel and gasoline.

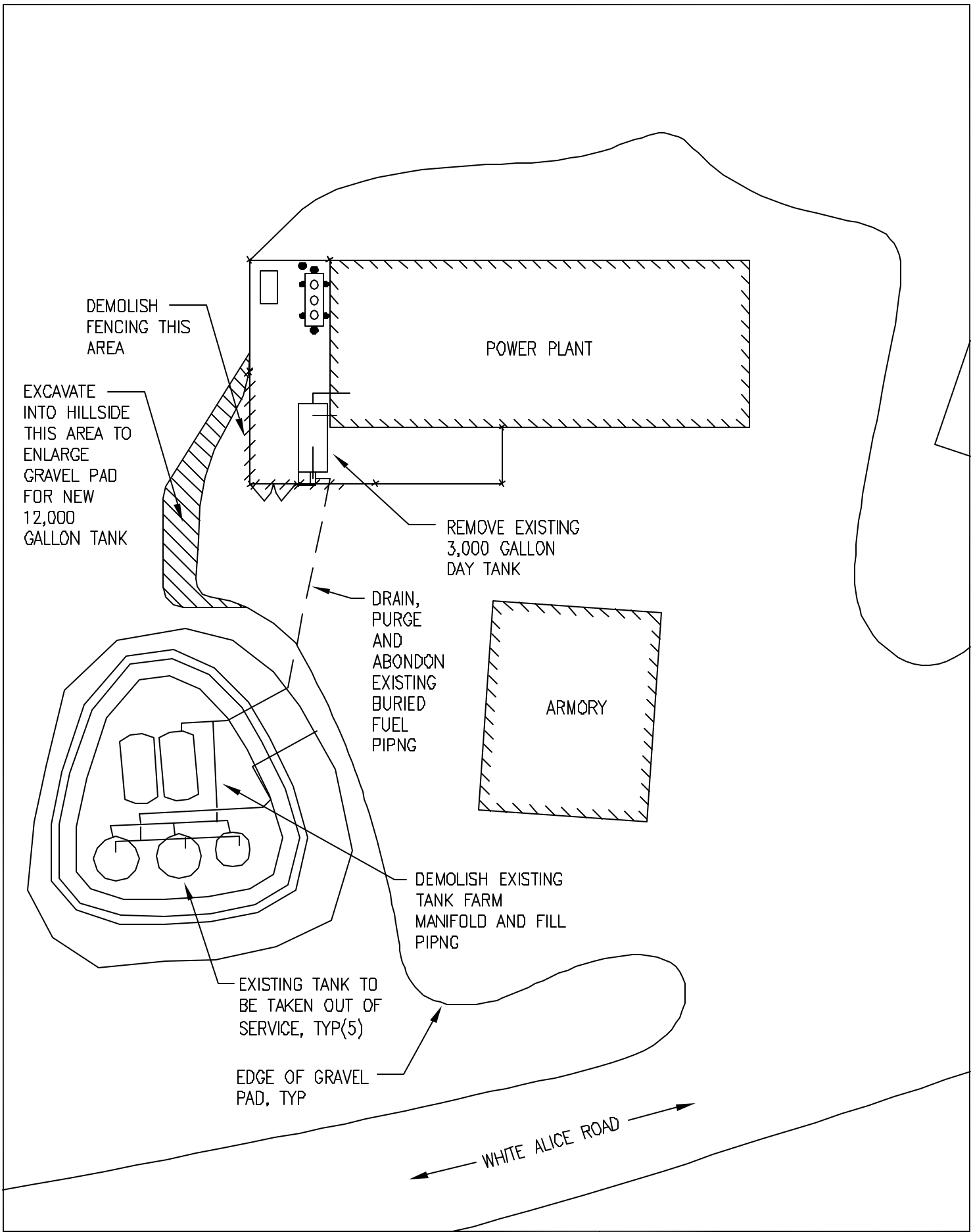
See attached Sheets M3 and M4 for conceptual plans.

A more detailed tank farm conceptual design will be included in the Hoonah Energy Infrastructures Project CDR to be completed by spring '07. If comments are received and a consensus is reached on a facility plan in a timely manner then final design can be completed in time for a spring '08 tank farm construction schedule.

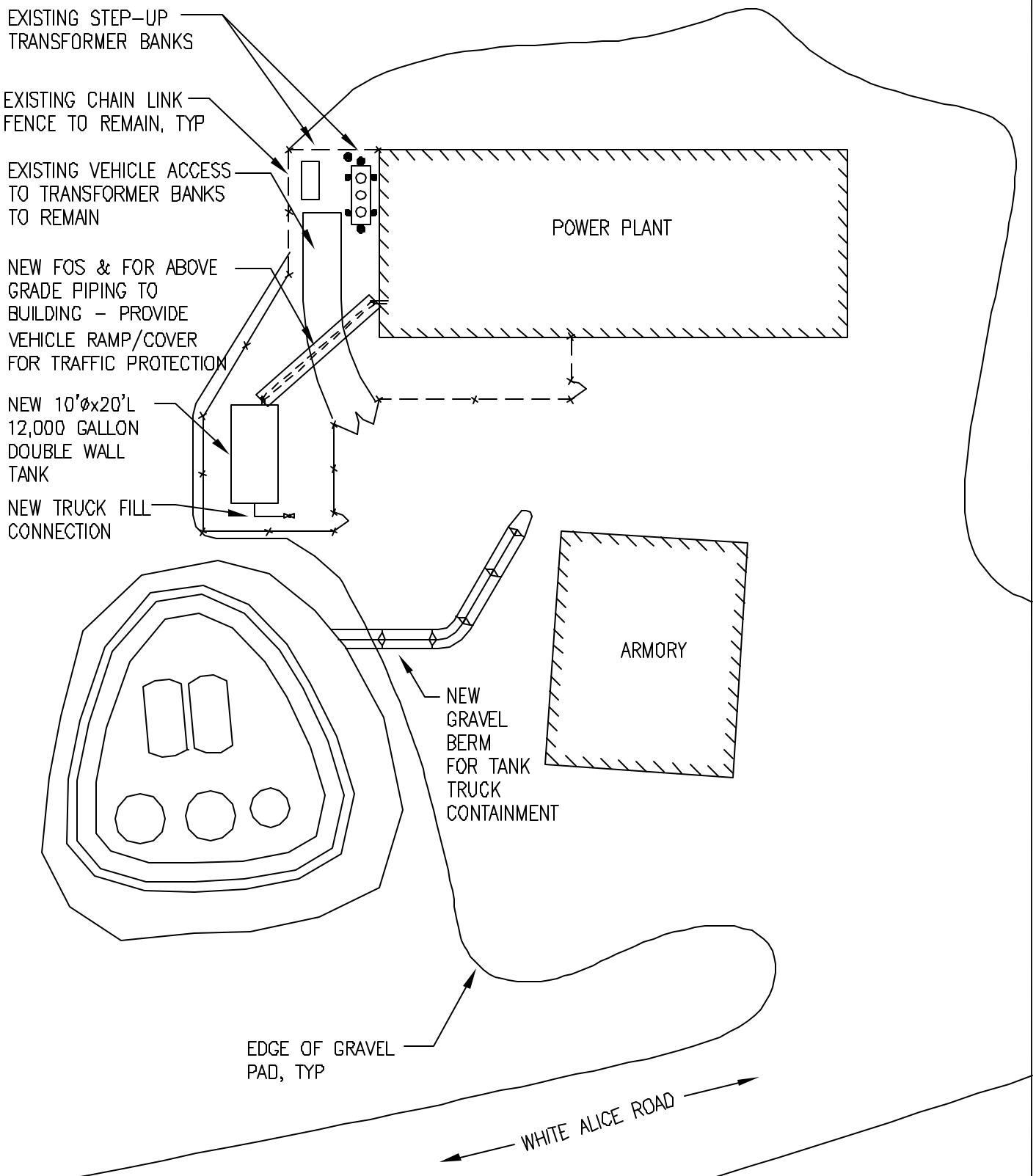
15) Alternative Energy:

The proposed AEL&P intertie as well as potential local hydroelectric and generation heat recovery projects have already been addressed in this report. The Alaska Energy Authority/Alaska Industrial Development and Export Authority published a draft Rural Alaska Energy Plan dated December 31, 2002 as a follow-up report to the previously released Screening Report of Alaska Rural Energy Plan dated April 2001. The Screening Report evaluated a dozen alternative energy technologies other than generation heat recovery. Only wind energy was identified as alternative energy technology warranting further evaluation in the draft Rural Alaska Energy Plan. According to the Wind Energy Resource Atlas of the United States the community of Hoonah is located within a class 3 wind regime and is not a viable candidate for a wind energy program using currently available technologies.

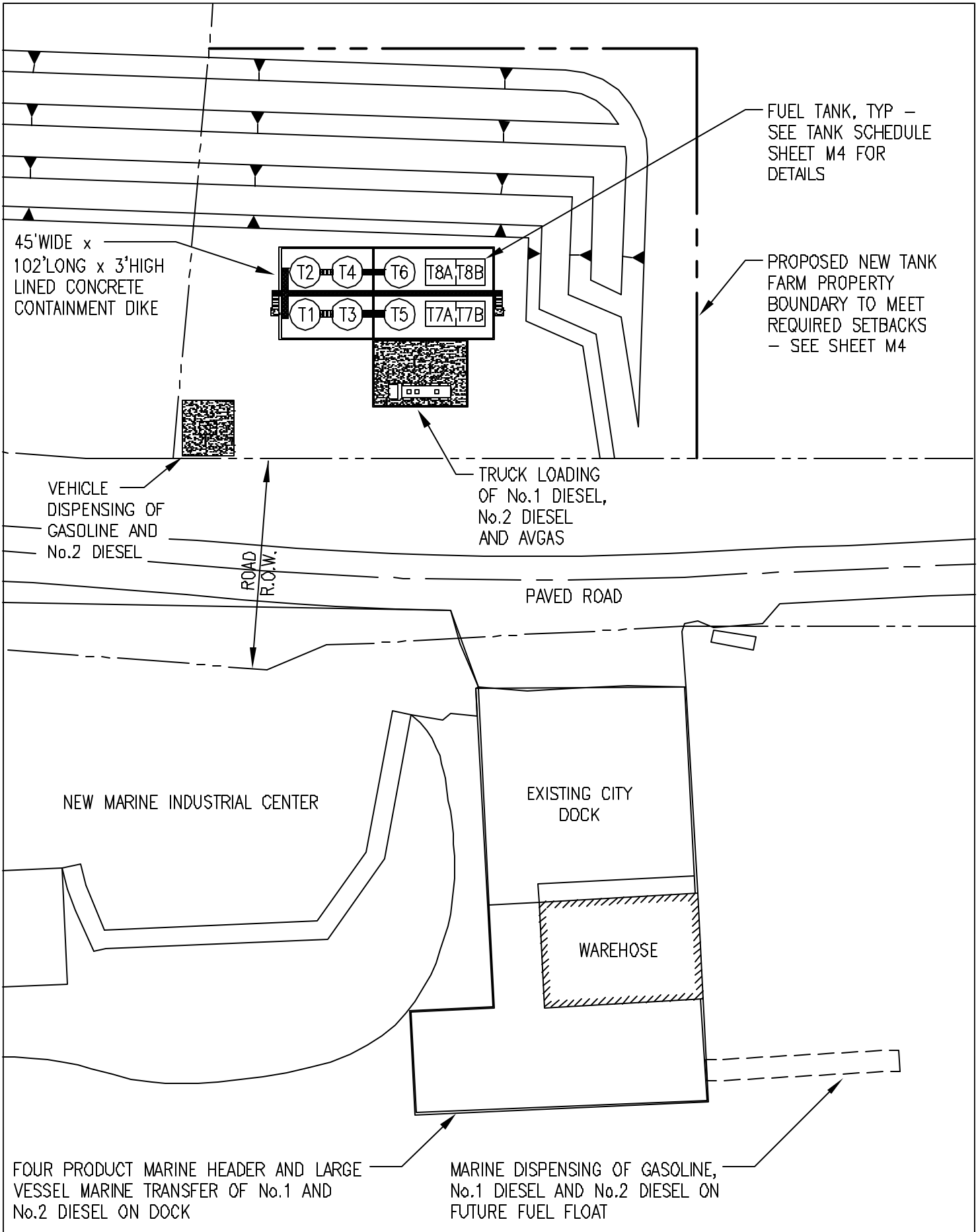
Please review the issues presented and call David Lockard at 269-4541 to discuss or fax your comments to 269-3044. In order to keep the CDR on schedule we need to receive all community comments no later than January 31, 2007. I look forward to working with you on this project.



PROJECT: HOONAH ENERGY INFRASTRUCTURE PROJECTS	DRAWN BY: JTD	SCALE: 1"=30'	State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 ALASKA ENERGY AUTHORITY
	DESIGNED BY: BCG	DATE: 11/13/06	
TITLE: IPEC SITE DEMOLITION/EXCAVATION PLAN	FILE NAME: HOONAH CDR	SHEET: M1 OF: 4	



PROJECT: HOONAH ENERGY INFRASTRUCTURE PROJECTS	DRAWN BY: JTD	SCALE: 1"=30'	State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 ALASKA ENERGY AUTHORITY
	DESIGNED BY: BCG	DATE: 11/13/06	
TITLE: NEW FUEL TANK INSTALLATION PLAN	FILE NAME: HOONAH-CDR	SHEET: M2 OF: 4	



PROJECT: HOONAH ENERGY INFRASTRUCTURE PROJECTS	DRAWN BY: JTD	SCALE: 1"=60'	State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 ALASKA ENERGY AUTHORITY
	DESIGNED BY: BCG	DATE: 11/13/06	
TITLE: PROPOSED NEW TANK FARM SITE PLAN	FILE NAME: HOONAH CDR	SHEET: M3 OF: 4	

SETBACK/SEPARATION REQUIREMENTS

THE CONSOLIDATED TANK FARM WILL PERFORM THREE FUNCTIONS – BULK STORAGE, BULK TRANSFER, AND DISPENSING. ALL TANKS ARE INSTALLED ABOVE GROUND. TO COMPLY WITH THE REQUIREMENTS OF THE 2006 INTERNATIONAL FIRE CODE, THE 2002 ALASKA ENERGY AUTHORITY/DIVISION OF FIRE PREVENTION MEMORANDUM OF AGREEMENT, AND STATE OF ALASKA REGULATIONS THE FOLLOWING MINIMUM CLEARANCES ARE REQUIRED:

10' FROM THE DISPENSER TO ALL BUILDINGS AND PROPERTY LINES.

20' FROM THE DISPENSER TO FIXED SOURCES OF IGNITION.

50' FROM THE DISPENSER TO ALL UNPROTECTED TANKS.

50' FROM THE DISPENSER TO THE BULK TRANSFER AREA.

50' FROM UNPROTECTED DISPENSING TANKS TO THE NEAREST IMPORTANT BUILDING OR NEAREST SIDE OF A PUBLIC WAY.

100' FROM UNPROTECTED DISPENSING TANKS TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON.

40' FROM 12,001–30,000 GAL BULK STORAGE TANKS TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON.

60' FROM 30,001–50,000 GAL BULK STORAGE TANKS TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON.

25' FROM THE BULK TRANSFER HOSE STAND TO THE NEAREST TANK, THE NEAREST IMPORTANT BUILDING, THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON, COMBUSTIBLE MATERIALS, AND FIXED SOURCES OF IGNITION. DISTANCE MAY BE REDUCED TO 15' IF NOT USED FOR TRANSFER OF CLASS I LIQUIDS.

25' FROM FUEL TANKS AND PIPELINES TO RESIDENTIAL WATER WELLS

100' FROM FUEL TANKS AND PIPELINES TO PUBLIC WATER WELLS

TANK SCHEDULE (ALL TANKS NEW CONSTRUCTION)

TANK #	OWNER (1)	TYPE (2)	FUNCTION	#1 DIESEL CAPAC.(3)	#2 DIESEL CAPAC.(3)	GASOLINE CAPAC.(3)	AVGAS CAPAC.(3)
T1	CITY	V	BULK			30,000	
T2	CITY	V	BULK	30,000			
T3	CITY	V	BULK		40,000		
T4	CITY	V	BULK		40,000		
T5	CITY	V	BULK		40,000		
T6	CITY	V	BULK		40,000		
T7A	CITY	SW, PARTITION	DISPENSING			10,000	
T7B	CITY	SW, PARTITION	BULK				10,000
T8A	CITY	SW, PARTITION	DISPENSING	10,000			
T8B	CITY	SW, PARTITION	DISPENSING		10,000		
PROJECT STORAGE CAPACITY BY PRODUCT				**40,000**	**170,000**	**40,000**	**10,000**
PROJECT TOTAL GROSS STORAGE CAPACITY							**260,000**

NOTES:
1) CITY OF HOONAH (CITY)
2) V = VERTICAL, SW = SINGLE WALL HORIZONTAL
3) ALL CAPACITIES ARE GROSS SHELL CAPACITY IN GALLONS

PROJECT: HOONAH ENERGY INFRASTRUCTURE PROJECTS	DRAWN BY: JTD	SCALE: NO SCALE	State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 ALASKA ENERGY AUTHORITY
	DESIGNED BY: BCG	DATE: 11/13/06	
TITLE: PROPOSED NEW TANK FARM SETBACK REQUIREMENTS AND TANK SCHEDULE	FILE NAME: HOONAH CDR	SHEET: M4 OF: 4	